NELP CREATES recipe for success

EVALUATE TECHNOLOGIES TO ENHANCE READINESS

recipe for success

The Navy Environmental Leadership Program (NELP) has created the right recipe for success—evaluate innovative technologies and management strategies to enhance warfighter readiness.

The NELP programs at Naval Station (NAVSTA) Mayport and Commander, Navy Region Southwest (CNRSW) continue to display environmental stewardship through the sound management of existing innovative technology initiatives in 2003 and the planning of initiatives in 2004.

NELP is reviewing the possibility of taking submarine hydraulic fluid and reusing the fluid in surface ships.

U.S. Navy photo by Chief Journalist David Nagle

The NELP Mayport program is supported by an Executive Steering Committee (ESC), Focus Group, NELP Manager and NELP Officer. Diane Lancaster, NELP Manager and LCDR Joseph Campisano, NELP Officer manage the NELP Mayport program out of the NAVSTA Mayport environmental office.

"We all benefit from lessons learned from testing new technologies and looking at new management practices. We learn what works, what does not work, and provide this information to benefit the Navy and Marine Corps," said CDR Mark Solberg, NELP Mayport Focus Group Member.

Together with the ESC, Technical Partners, Quality Management Boards (QMB), Process Action Team (PAT), Working Groups, and Fleet volunteers, the NELP Mayport Focus Group managed the following environmental initiatives in 2003:

Identify Optimum Fueling/Defueling Procedures of Aircraft

Navy aircraft occasionally have fuel spills during fueling and defueling procedures. NELP Mayport chartered a QMB to review current aircraft procedures and make recommendations to improve fueling/defueling procedures. QMB recommendations will be released in 2004.

Recycling Hydraulic Fluid from Submarines for Potential Use in Ships

A NELP QMB is reviewing the possibility of taking submarine hydraulic fluid from Naval Submarine Base (NSB) Kings Bay and reusing the fluid in surface ships at NAVSTA Mayport. Each year, the eight submarines at NSB Kings Bay drain their 5,000-gallon hydraulic fluid tanks to hydro-test them and then refill the tanks with new fluid. The old fluid is disposed of as waste. The QMB will release recommendations in 2004.

Convergent Non-Skid Spray Coating for Ship Decks

A NELP QMB is working with the Naval Surface Warfare Center—Carderock Division (NSWCCD) to test new materials that will replace the current heavy Volatile Organic Compounds (VOC) nonskid material with a low VOC product that handles impact and adheres better to ship decks. The low VOC product requires different equipment for application.

Testing of one of the application methods is currently planned for a NAVSTA Mayport vessel. Results of the tests are expected in 2004.


Convergent Non-Skid Technology.

Shipboard Environmental Compliance Guide

NELP established a QMB to research and create a new Shipboard Environmental Compliance Guide. The guide will provide a ready reference to assist Afloat Environmental Coordinators in providing an effective shipboard environmental program. The guide is expected to be completed in 2004.

Closed Loop Fluid Changing System

NELP, in cooperation with Harbor Operations at NAVSTA Mayport, is testing the use of a vacuum system that removes fluid and replaces it with clean fluid using the same quick-release plug. The system is designed to handle hot oil and fluids other than oil. The system also extracts oil from filters in addition to gravity drainage. Harbor Operations is currently testing a closed loop fluid changing system on small boat engines. Test results will be released in early 2004.


LED Battle Lantern.

Delicate Substrate Paint Strippers

A NELP QMB is evaluating paint removal operations to reduce the burden on the deckplate sailor. Currently all delicate substrate materials must be hand sanded for paint removal, which is very labor intensive. NELP, in partnership with the Naval Surface Warfare Center—Carderock Division, is investigating different methods to remove these coatings. Test results will be available in 2004.

LED Battle Lanterns

NELP is investigating the use of Light Emitting Diodes (LED) to replace incandescent bulbs used in afloat battle lanterns. The LED battle lanterns provide light performance equivalent to incandescent bulbs; greater battery life; longer bulb life; wider beam axis with more useful light; and storage space savings. On a CVN 68 Class Ship with 4,300 battle lanterns, the cost of battery replacement for incandescent battle lanterns


Oil Vacuum System.

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(two each) per ship deployment runs $70,000 to $105,000. Those same battle lanterns can be modified for $30.00 to $50.00 each in materials, plus one man-hour. Study results will be available in 2004.

The NELP Mayport Focus Group selected the following environmental initiatives to pursue in 2004:

EnviroManager

In response to Executive Order (EO) 13148 "Greening the Government through Leadership in Environmental Management", NELP Mayport will institute a command computerized program designed to document all 17 elements required in an effective Environmental Management System (EMS). The EMS process identifies gaps in compliance; documents environmental aspects and impacts of operations; and identifies and ranks objectives and targets. In addition, the EMS process documents management commitment and policy guidance; structure and responsibilities; training; operational control; emergency preparedness and response; document control; and third party audits. EnviroManager is a comprehensive tracking tool that provides a single succinct method of keeping track of the multiple requirements of an effective EMS program. NELP is planning to test the web-enabled version of EnviroManager.

Sphagnum Peat Moss Absorbent

NELP Mayport will work with the Aircraft Intermediate Maintenance Division (AIMD) Mayport in 2004 to test an innovative and environmentally friendly, natural sphagnum material for spill clean up. The material is capable of absorbing polychlorinated biphenyls (PCB), oil based paints, inks and dyes, animal fats, vegetable oils and blood. The material is scattered uniformly on the surface of a spill until the underlying spill is no longer visible and only the light brown color of the unused product is visible. When used on a water surface, 15 percent more of the product is typically required. The sphagnum peat moss material has the ability to internally absorb a much greater volume of oils

Sphagnum Peat Moss Absorbent.

and other fluids that do not mix with water. It does not require specially trained technicians or high tech equipment for handling or disposing of the spent peat. The spent peat will not leach or discharge used pollutants, making it clean and easy to handle. The spent peat can be incinerated or disposed of in landfills pending test results of hazardous characteristics. The spent peat can be land farmed pending biodegradability testing. Test results will be available in 2005.

Alcohol Based Paint Strippers

In 2004, NELP Mayport will address a number of issues pertaining to established paint removal methods including the volume of waste produced, potential deckplate sailor health concerns, high labor costs, and other relevant environmental concerns. Historically, removal methods have included the use of methylene chloride-based paint strippers and blasting technologies. This technology initiative will look at a relatively new alcohol based paint stripper. This stripper is intended for use on painted metal or wood surfaces, including those used in aeronautical and marine applications. The alcohol based paint stripper uses a less toxic and environmentally more suitable chemical-based stripper formulation that results in a smaller waste volume and is easy to apply and remove. Test results will be available in 2004.

Like its east coast counterpart, NELP CNRSW established a management team (as mandated by the Chief of Naval Operations (CNO)) to initiate, coordinate and monitor environmental initiative projects and to ensure that NELP meets the objectives and mission originally established by CNO. Arno Bernardo, NELP Coordinator, manages the NELP CNRSW program out of the environmental office at the Naval Air Station (NAS) North Island.

NELP CNRSW evaluated the following environmental initiatives in 2003:

Paint Freezing

NELP CNRSW has developed a new paint freezing method as a simple solution to reducing the short pot-life of paint and the excessive hazardous waste generated from paint operations at the Naval Air Depot (NADEP) North Island, Coronado, CA.


Paint Freezing Technology.

Two types of coating are used on aircraft at NAS North Island. One coating is a high solids polyurethane coating that costs $90.00 per gallon and the other is a new paint called CAAPCOAT that costs $260.00 per kit or one-gallon container. Historically, due to the short pot-life of polyurethane paints, there has not been a method to preserve and then reuse these paints. As a result, the paint was used for one application and any remaining paint would be disposed of as a hazardous waste. The purchase and disposal of the paint associated with this process has been costly.

When an aircraft is being painted, any remaining paint for that aircraft is labeled with the aircraft number and then put into a subzero freezer set at minus 61 degrees Celsius. The paint is ready for use after being thawed for 20 minutes and put into a shaker. The paint is then ready to be applied to the aircraft. The paint can be kept and reused on the same aircraft for up to a month.

Solar-Powered Skimmer Pump

NELP CNRSW has deployed a solar-powered skimmer pump (SPSP) system at NAS North Island in an effort to collect light no-aqueous phase liquid (LNAPL) contaminants from groundwater wells in areas that are being remediated. Several Navy remedial efforts are underway at locations in San Diego where the cost and feasibility of supplying power to LNAPL removal systems is problematic. After evaluating these costs and installation issues, the Navy chose to purchase a skimmer pump system that operates using an air compressor powered by a battery that is solar energy re-chargeable.


Solar-Powered Skimmer Pump.

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Pervious Concrete Paving Study

NELP CNRSW is performing a demonstration project to test porous cement-based paving material that allows for stormwater percolation, allows water filtering, and alleviates pollutants. The material can be used in parking lots, turf covered areas, walkways, and driveways. Potential benefits of using pervious concrete include:

- Reducing stormwater runoff;
- Filtering oils, chemicals, and pollutants;
- Eliminating the need for storm drains; and
- Ensuring the ecosystem from erosion, flash floods, and clogged drainage systems.

Results from the study will be released in 2004.

Evidence of reductive dechlorination exists at all five NAS North Island Chlorinated-Volatile Organic Compounds (c-VOC) plumes examined. Each of the c-VOC plumes contains c-VOC daughter products, including dichloroethene (DCE) and vinyl chloride (VC), to varying extents. Production of ethene, an end-product of the dechlorination process, has been documented at each of the three sites where it has been analyzed (IR sites 5 and 9 and OU 24). Likewise, the dechlorinating microbe dehalococcoides ethenogenes (DHE) has been detected at each of three sites where it has been analyzed (IR sites 5 and 9 and OU 20).

"We like to evaluate effective environmental products like the sphagnum peat moss absorbent to cut operational cost, improve industrial processes, and reduce the deckplate sailor's workload."

—AM1 Ken Ward, NELP Mayport Focus Group Member

Reductive Dechlorination

Reductive dechlorination of chlorinated solvents sites in groundwater was assessed by NELP CNRSW at five installation restoration (IR) sites at NAS North Island (operable units (OU) 11, 20 and 24 and IR sites 5 and 9). This base wide approach has provided insights on the viability of natural attenuation and enhanced bioremediation technologies at the base.

Reductive dechlorination is a naturally occurring process that involves the degradation of chlorinated ethenes under anaerobic conditions. In this process, the halogenated hydrocarbon serves as an electron acceptor and loses a halogen atom in exchange for a hydrogen atom. Reductive dechlorination proceeds in sequential steps, so that tetrachloroethene (PCE) and trichloroethene (TCE) transform into inert ethene gas.

Evidence of complete reductive dechlorination and the associated DHE detections at NAS North Island are significant for the IR Program. Because the groundwater underneath NAS North Island is not designated for municipal or domestic water supply use under the State water quality regulations, evidence of reductive dechlorination can support monitored natural attenuation strategies in some instances. Elsewhere, where active remediation may be appropriate, the field evidence supports application enhanced bioremediation.

Fitch Fuel Catalyst Pilot Study

NELP CNRSW is using two government-owned vehicles from Naval Submarine Base (NSB) Point Loma to study the collection of data before and after the installation and operation of a fitch fuel catalyst. A fitch fuel catalyst is designed to improve the combustibility of hydrocarbon fuels by treating the fuel immediately before it enters the engine combustion chamber. The catalyst can be used with gasoline, diesel, methanol, and other liquid fuels. The study is comparing fuel economy, engine oil analysis, and the emissions of hydrocarbons and carbon monoxide. Study results will be released in 2004.

Sequential Biological Destruction of Mixed Recalcitrant Groundwater Contaminants

NELP CNRSW demonstrated a pilot-scale sequential biological groundwater treatment system at IR site 9 at NAS North Island. The site was a former chemical waste disposal area from the late 1940s through the mid-1970s. The operations disposed of the liquid chemical waste generated at the site (reportedly up to 32 million gallons). As a result, groundwater at this site is contaminated with c-VOCs, (primarily trichloroethene (TCE), trichloroethane (TCA), cis-1, 2-dichloroethene (DCE), vinyl chloride (VC)) and weathered fuel products.

At the demonstration site, a low-profile shallow tray air stripper followed by a liquid phase granular activated carbon (GAC) adsorption system is in place to remove TCE and other contaminants from the extracted groundwater. For the purposes of this demonstration, a small slip-stream was sent upstream of the air stripper to the biological treatment system. The biological treatment system consists of a fluidized bed reactor (FBR) where microbes grow on a hydraulically fluidized bed of GAC media particles. The use of the GAC as the fluidized bed media integrates the removal of mechanisms of biotreatment and physical-chemical adsorption into the reactor, further enhancing the ability of the system to deal with the issues of microbial inhibition due to toxic inputs and treatment of recalcitrant compounds.

The FBR anaerobic treatment reduced TCE and TCA by approximately 85 percent at a five-hour hydraulic residence time (HRT). Overall, the sequential anaerobic and aerobic treatment was found to be effective in reducing TCE and TCA by approximately 99 percent and chemical oxygen demand (COD) loading by approximately 85 percent without creating TCE daughter products. Additionally, the process was shown to be very robust in dealing with changing field conditions (increasing groundwater concentrations), temperature changes, and process interruptions. The Navy is currently proceeding with full-scale construction and installation and is expected to be completed in fall 2003.

NELP CNRSW has identified the following environmental initiative for evaluation in 2004:

Torpedo Flushing

Under the NELP program at CNRSW, the Navy is looking at technologies to help reduce the waste associated with torpedo flushing. At Naval Weapons Station (NWS) Seal Beach San Diego (SD) Detachment, expended torpedoes are transported to the facility and then taken to an outside cleaning

about NELP

The Chief of Naval Operations chartered NELP in 1993. The mission of NELP is to support Navy warfighter operational readiness through the identification, demonstration and communication of innovative ways to perform daily operations while minimizing the impacts on our environment and promoting environmental stewardship.

The program serves as a test bed for new and innovative technology and focused management that addresses the full spectrum of environmental issues. NELP exports its successes and lessons learned throughout the Navy and Marine Corps family.

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bay where they are flushed and preserved. There are five wastestreams associated with this process:

1. Ullage wastewater,
2. Engine parts cleaning oily waste,
3. Engine compartment flushing wastewater stream,
4. Transducer flushwater, and
5. Area wash down wastewater

All wastestreams are consolidated in an on-site underground storage tank (UST) and disposed of as hazardous waste (HW). Disposable suits, gloves and towels contaminated with combustible sludge and alcohol are also generated. Currently the wastestream accounts for 97 percent of the waste generated at NWS Seal Beach SD Detachment. In 2004, CNRSW will be researching various ways to reduce torpedo flushing hazardous waste, including waste reduction and recycling opportunities. Results from the study will be released in 2005.

A Surface Vessel Torpedo Tube fires a lightweight torpedo from the starboard side of the recently commissioned guided missile destroyer USS PREBLE (DDG 88) during a Combat Systems Ship Qualification Test. The NELP program at CNRSW is looking at ways to reduce the waste associated with the flushing of expended torpedoes.

U.S. Navy photo by Photographer's Mate 3rd Class Ramon Preciado

Projects like these guarantee NELP's position on the forefront of innovative technology evaluations. These evaluations are used to authenticate the newest, best and most environmentally sound technologies necessary to maintain the readiness of the warfighter. That is NELP's recipe for success. ⚓

For more information about the NELP Programs at NAVSTA Mayport and NRSW San Diego, read our article entitled "Navy Environmental Leadership Program (NELP) Celebrates 10 Years of Service: Program Evaluates Innovative Technologies and Management Strategies" in this issue of Currents.

U.S. Navy photos: CH-53E Super Stallion by Photographer's Mate Airman Kenny Swartout, F/A-18F Super Hornet by Airman Angel G. Hilbrands.

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